

2015 ACM/IEEE 18th International Conference on Model Driven Engineering Languages and Systems (MODELS 2015)

**Ottawa, Ontario, Canada
30 September – 2 October 2015**



**IEEE Catalog Number: CFP15UML-POD
ISBN: 978-1-4673-6909-1**

Contents

Frontmatter

Message from the Chairs	iii
MODELS 2015 Organization	iv
Sponsors	viii

Keynotes

Modelling the Climate System: Is Model-Based Science Like Model-Based Engineering? (Keynote) Steve Easterbrook — <i>University of Toronto, Canada</i>	1
Software Supply Chains (Keynote) Gail Murphy — <i>University of British Columbia, Canada</i>	2
Automobile: Aircraft or Smartphone? Modeling Challenges and Opportunities in Automotive Systems (Keynote) Ramesh S — <i>General Motors, USA</i>	3

Foundations

Reusable Event Types for Models at Runtime to Support the Examination of Runtime Phenomena Michael Szvetits and Uwe Zdun — <i>University of Applied Sciences Wiener Neustadt, Austria; University of Vienna, Austria</i>	4
Incremental Symbolic Execution of Evolving State Machines Amal Khalil and Juergen Dingel — <i>Queen's University, Canada</i>	14
A Framework for Relating Syntactic and Semantic Model Differences Shahar Maoz and Jan Oliver Ringert — <i>Tel Aviv University, Israel</i>	24
Engineering Tagging Languages for DSLs Timo Greifenberg, Markus Look, Sebastian Roidl, and Bernhard Rumpe — <i>RWTH Aachen University, Germany</i>	34
Process Mining in Software Systems: Discovering Real-Life Business Transactions and Process Models from Distributed Systems Maikel Leemans and Wil M. P. van der Aalst — <i>Eindhoven University of Technology, Netherlands</i>	44
State Machine Antipatterns for UML-RT Tuhin Kanti Das and Juergen Dingel — <i>Queen's University, Canada</i>	54
Enhancing the Communication Value of UML Models with Graphical Layers Yosser El Ahmar, Sébastien Gérard, Cédric Dumoulin, and Xavier Le Pallec — <i>CEA, France; University of Lille, France</i>	64
A Model-Based Framework for Probabilistic Simulation of Legal Policies Ghanem Soltana, Nicolas Sannier, Mehrdad Sabetzadeh, and Lionel C. Briand — <i>University of Luxembourg, Luxembourg</i>	70
Stream my Models: Reactive Peer-to-Peer Distributed Models@run.time Thomas Hartmann, Assaad Moawad, Francois Fouquet, Gregory Nain, Jacques Klein, and Yves Le Traon — <i>University of Luxembourg, Luxembourg</i>	80
Beyond Discrete Modeling: A Continuous and Efficient Model for IoT Assaad Moawad, Thomas Hartmann, Francois Fouquet, Gregory Nain, Jacques Klein, and Yves Le Traon — <i>University of Luxembourg, Luxembourg</i>	90
Infrastructure as Runtime Models: Towards Model-Driven Resource Management Filip Křikava, Romain Rouvoy, and Lionel Seinturier — <i>Czech Technical University, Czech Republic; INRIA, France</i>	100
Fragmenta: A Theory of Fragmentation for MDE Nuno Amálio, Juan de Lara, and Esther Guerra — <i>University of York, UK; Autonomous University of Madrid, Spain</i>	106
Consistent Co-Evolution of Models and Transformations Angelika Kusel, Jürgen Etzlstorfer, Elisabeth Kapsammer, Werner Retschitzegger, Wieland Schwinger, and Johannes Schönböck — <i>JKU Linz, Austria; University of Applied Sciences Upper Austria at Hagenberg, Austria</i>	116

Synthesizing Tests for Combinatorial Coverage of Modal Scenario Specifications	
Valerio Panzica La Manna, Itai Segall, and Joel Greenyer — <i>Massachusetts Institute of Technology, USA; Bell Labs, Israel; Leibniz Universität Hannover, Germany</i>	126
Systematically Deriving Domain-Specific Transformation Languages	
Katrin Hölldobler, Bernhard Rumpe, and Ingo Weisemöller — <i>RWTH Aachen University, Germany</i>	136
Quick Fixing ATL Model Transformations	
Jesús Sánchez Cuadrado, Esther Guerra, and Juan de Lara — <i>Autonomous University of Madrid, Spain</i>	146
A-posteriori Typing for Model-Driven Engineering	
Juan de Lara, Esther Guerra, and Jesús Sánchez Cuadrado — <i>Autonomous University of Madrid, Spain</i>	156
Pattern-Based Development of Domain-Specific Modelling Languages	
Ana Pescador, Antonio Garmendia, Esther Guerra, Jesús Sánchez Cuadrado, and Juan de Lara — <i>Autonomous University of Madrid, Spain</i>	166
Checking Concurrent Behavior in UML/OCL Models	
Nils Przigoda, Christoph Hilken, Robert Wille, Jan Peleska, and Rolf Drechsler — <i>University of Bremen, Germany</i>	176
A Behavioral Coordination Operator Language (BCoOL)	
Matias Ezequiel Vara Larsen, Julien DeAntoni, Benoit Combemale, and Frédéric Mallet — <i>University of Nice Sophia Antipolis, France; INRIA, France</i>	186
Textual Diagram Layout Language and Visualization Algorithm	
Balázs Gregorics, Tibor Gregorics, Gábor Ferenc Kovács, András Dobreff, and Gergely Dévai — <i>Eötvös Loránd University, Hungary</i>	196
A Controlled Experiment with Usability Inspection Techniques Applied to Use Case Specifications: Comparing the MIT 1 and the UCE Techniques	
Natasha M. Costa Valentim, Jacilane Rabelo, Ana Carolina Oran, Tayana Conte, and Sabrina Marczak — <i>Federal University of Amazonas, Brazil; PUCRS, Brazil</i>	206
A Unifying Approach to Connections for Multi-Level Modeling	
Colin Atkinson, Ralph Gerbig, and Thomas Kühne — <i>University of Mannheim, Germany; Victoria University of Wellington, New Zealand</i>	216
A Statistical Analysis Approach to Assist Model Transformation Evolution	
Roberto Rodriguez-Echeverria and Fernando Macias — <i>University of Extremadura, Spain; Bergen University College, Norway</i>	226
Enriching Megamodel Management with Collection-Based Operators	
Rick Salay, Sahar Kokaly, Alessio Di Sandro, and Marsha Chechik — <i>University of Toronto, Canada; McMaster University, Canada</i>	236
SoSPa: A System of Security Design Patterns for Systematically Engineering Secure Systems	
Phu H. Nguyen, Koen Yskout, Thomas Heyman, Jacques Klein, Riccardo Scandariato, and Yves Le Traon — <i>University of Luxembourg, Norway; KU Leuven, Belgium; University of Luxembourg, Luxembourg; KU Leuven, Sweden</i>	246
Fully Verifying Transformation Contracts for Declarative ATL	
Bentley James Oakes, Javier Troya, Levi Lúcio, and Manuel Wimmer — <i>McGill University, Canada; Vienna University of Technology, Austria</i>	256
Extracting Frame Conditions from Operation Contracts	
Philipp Niemann, Frank Hilken, Martin Gogolla, and Robert Wille — <i>University of Bremen, Germany</i>	266
Identification of Simulink Model Antipattern Instances using Model Clone Detection	
Matthew Stephan and James R. Cordy — <i>Miami University, USA; Queen's University, Canada</i>	276
Concern-Oriented Interfaces for Model-Based Reuse of APIs	
Matthias Schöttle and Jörg Kienzle — <i>McGill University, Canada</i>	286
On the Use of UML Documentation in Software Maintenance: Results from a Survey in Industry	
Ana M. Fernández-Sáez, Danilo Caivano, Marcela Genero, and Michel R. V. Chaudron — <i>University of Castile-La Mancha, Spain; University of Bari, Italy; Chalmers University of Technology, Sweden</i>	292
Performance Prediction upon Toolchain Migration in Model-Based Software	
Aymen Ketata, Carlos Moreno, Sebastian Fischmeister, Jia Liang, and Krzysztof Czarnecki — <i>University of Waterloo, Canada</i>	302

Employing Classifying Terms for Testing Model Transformations Martin Gogolla, Antonio Vallecillo, Loli Burgueño, and Frank Hilken — <i>University of Bremen, Germany; University of Málaga, Spain</i>	312
Pattern-Based Debugging of Declarative Models Vajih Montaghani and Derek Rayside — <i>University of Waterloo, Canada</i>	322
Integrating Goal-Oriented and Use Case-Based Requirements Engineering: The Missing Link Tuong Huan Nguyen, John Grundy, and Mohamed Almorsy — <i>Swinburne University of Technology, Australia</i>	328

MDE in Practice

Applying Product Line Use Case Modeling in an Industrial Automotive Embedded System: Lessons Learned and a Refined Approach Ines Hajri, Arda Goknil, Lionel C. Briand, and Thierry Stephany — <i>University of Luxembourg, Luxembourg; IEE, Luxembourg</i>	338
Systematic Generation of Standard Compliant Tool Support of Diagrammatic Modeling Languages Alexis Fouché, Florian Noyrit, Sébastien Gérard, and Maged Elaasar — <i>CEA, France; Carleton University, Canada</i> .	348
Improving Reuse by means of Asymmetrical Model Migrations: An Application to the Orcc Case Study Paola Vallejo, Mickaël Kerboeuf, Kevin J. M. Martin, and Jean-Philippe Babau — <i>University Bretagne-Occidentale, France; University Bretagne-Sud, France</i>	358
Toward Overcoming Accidental Complexity in Organisational Decision-Making Vinay Kulkarni, Souvik Barat, Tony Clark, and Balbir Barn — <i>Tata Consultancy Services, India; Middlesex University, UK</i>	368
Modeling User Intentions for In-Car Infotainment Systems using Bayesian Networks Daniel Lüddecke, Christoph Seidl, Jens Schneider, and Ina Schaefer — <i>Volkswagen, Germany; TU Braunschweig, Germany</i>	378
Feature Modeling of Two Large-Scale Industrial Software Systems: Experiences and Lessons Learned Daniela Lettner, Klaus Eder, Paul Grünbacher, and Herbert Prähofer — <i>JKU Linz, Austria; KEBA, Austria</i>	386
Formalizing the ISO/IEC/IEEE 29119 Software Testing Standard Shaukat Ali and Tao Yue — <i>Simula Research Laboratory, Norway</i>	396
A Megamodel for Software Process Line Modeling and Evolution Jocelyn Simmonds, Daniel Perovich, María Cecilia Bastarrica, and Luis Silvestre — <i>University of Chile, Chile</i> . . .	406
Modular Model-Based Supervisory Controller Design for Wafer Logistics in Lithography Machines Bram van der Sanden, Michel Reniers, Marc Geilen, Twan Basten, Johan Jacobs, Jeroen Voeten, and Ramon Schiffelers — <i>Eindhoven University of Technology, Netherlands; ASML, Netherlands</i>	416
An Automated Model Based Testing Approach for Platform Games Sidra Iftikhar, Muhammad Zohaib Iqbal, Muhammad Uzair Khan, and Wardah Mahmood — <i>National University of Computer and Emerging Sciences, Pakistan; National University of Computer and Emerging Sciences, Luxembourg</i> .	426
Model-Driven Regulatory Compliance: A Case Study of "Know Your Customer" Regulations Sagar Sunkle, Deepali Kholkar, and Vinay Kulkarni — <i>Tata Consultancy Services, India</i>	436

SoSyM Abstracts

Identifying Duplicate Functionality in Textual Use Cases by Aligning Semantic Actions (SoSyM Abstract) Alejandro Rago, Claudia Marcos, and J. Andrés Diaz-Pace — <i>UNICEN University, Argentina</i>	446
Enhanced Graph Rewriting Systems for Complex Software Domains (SoSyM Abstract) Cédric Eichler, Thierry Monteil, Patricia Stolf, Alfredo Grieco, and Khalil Drira — <i>CNRS, France; IRIT, France; Politecnico di Bari, Italy</i>	447
A Situational Method for Semi-automated Enterprise Architecture Documentation (SoSyM Abstract) Matthias Farwick, Christian M. Schweda, Ruth Breu, and Inge Hanschke — <i>University of Innsbruck, Austria; Reutlingen University, Germany; Lean 42, Germany</i>	448

Formalizing and Verifying Stochastic System Architectures Using Monterey Phoenix (SoSyM Abstract)
Yang Liu, Mikhail Auguston, Jun Sun, Jin Song Dong, and Tieming Chen — *Nanyang Technological University, Singapore; Naval Postgraduate School, USA; Singapore University of Technology and Design, Singapore; National University of Singapore, Singapore; Zhejiang University of Technology, China* 449

Author Index 450